NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
199 Brickyard Rd Farmington, CT 06032
860-209-4690
denise@northeastsitesolutions.com

January 26, 2017

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
90 Hattertown Road, Newtown CT 06470
Latitude: 41.36329167
Longitude: -73.32923330
T-Mobile Site#: CTFF626A_L700

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 54-foot level of the existing 59-foot silo at 1 Hattertown Road, Newtown, CT. The tower and property are both owned by Linda Cavaliere. T-Mobile now intends to replace three (3) of its existing antennas with three (3) new 700 MHz antenna and add six (6) Coax and three (3) Bias Tees. The new antennas would be installed at the 54-foot level of the tower.

Planned Modifications:

Remove: NONE

Remove and Replace:
(3)APX18D-209015-C Antenna (REMOVE) - (3) COMMSCOPE DBXNH-6565A-A2M Antenna **(REPLACE)**

Install New: (6) 1-1/4" Coax
(3) Bias Tee

Existing to Remain:
(3) Twin TMA
(6) 1-1/4" Coax

This facility was approved by the Connecticut Siting Council. Petition No.820 – Approval was received for the installation of a telecommunication tower within the existing 59-ft silo. T-Mobile was approved with a 54-foot RAD center. Please see attached.

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NORTHEAST SITE SOLUTIONS
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Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman E. Patricia Llodra, Elected Official and George Benson, Director of Planning for the Town of Newtown, as well as the property owner and the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S;A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Denise Sabo
Mobile: 860-209-4690
Fax: 413-521-0558
Office: 199 Brickyard Rd, Farmington, CT 06032
Email: denise@northeastsitesolutions.com

Attachments
cc: E.Patricia Llodra - First Selectman-as elected official
George Benson – Director of Planning
Linda Cavaliere - as tower owner and property owner

Exhibit A

Petition No. 820
Omnipoint Communications (T-Mobile)
Newtown, Connecticut
Staff Report
July 20, 2007

On June 27, 2007, the Connecticut Siting Council (Council) received a petition from Omnipoint Communications (T-Mobile) for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the installation a telecommunications tower inside an existing 59-foot tall silo located at 90 Hattertown Road in Newtown. The petition was field reviewed by Council member Ed Wilensky and Council staff member David Martin on July 19, 2007. T-Mobile representatives Karina Fournier, Russ Moffet, Dan Koon, and Alex Murillo attended the field review. Town officials, the property owners and abutting landowners were notified of the proposal.

T-Mobile would flush mount three antennas near the top of the tower at a centerline height of 54 feet above ground level. The silo is located in the northwest corner of a five acre residential lot owned by Linda Cavaliere. It is no longer being used for any agriculture or other purposes. The nearest house is located approximately 100 feet to the west of the silo on an adjacent lot. There are other residences on surrounding lots, but the location of the silo and the abundance of mature deciduous trees in the area restrict the visibility of the silo.

T-Mobile would locate its tower and antennas completely within the silo. Its ground equipment would consist of cabinets on concrete pads and would also be located within the silo. Utilities would be brought to the silo from an existing utility pole on Hattertown Road along the northern edge of the Cavaliere property. The top of the silo would be removed and replaced with a replica composed of RF transparent materials.

A nearby neighbor attended the field review and expressed her concerns over the change this proposal would bring to her neighborhood. She came to the field review in response to a notice T-Mobile sent to the nearest residents.

The proposed facility would enable T-Mobile to cover a portion of Route 302 and adjacent areas in the southwestern section of Newtown. This facility would hand off signals to a site in Bethel to the west.

The power density of the antennas would represent 25.3% of the FCC maximum exposure limit.

T-Mobile's facility would have minimal impact on the surrounding residential neighborhood and would enable T-Mobile fill a significant existing coverage gap. Staff recommends approval.

View of Silo

Exhibit B

Town of Newtown, CT
Property Listing Report

Map Block Lot 13-1-14

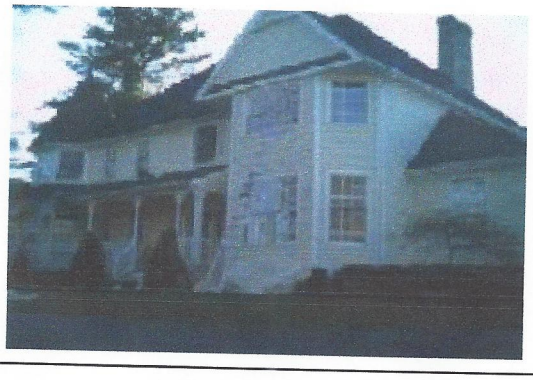
Account 00038000

Property Information

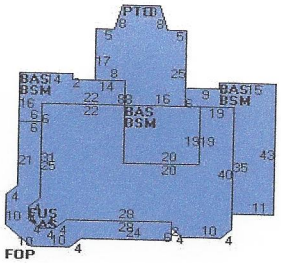
Owner	CAVALIERE LINDA
Co-Owner	
Address	90 HATTERTOWN ROAD
Mailing Address	90 HATTERTOWN ROAD NEWTOWN CT 06470
Land Use	1010 Single Family
Land Class	R
Vision ID	11387
School Zone	
Town Clerk Map	

Fire District	
Census Tract	B
Neighborhood	105
Zoning Code	R-2
Acreage	2.7
Utilities	Well,Septic
Lot Setting/Desc	
Voting District	
Borough	
Historic	

Photo



Sketch



Construction Details

Year Built	1996
Stories	2.00
Building Style	Colonial
Building Use	Residential
Building Condition	A-
Floors	Hardwood
Total Rooms	

Bedrooms	4
Full Bathrooms	3
Half Bathrooms	1
Bath Style	Typical
Kitchen Style	Typical
Roof Style	Gable
Roof Cover	Arch Shingles

Exterior Walls	Clapboard
Interior Walls	Drywall
Heating Type	Forced Hot Air
Heating Fuel	Oil
AC Type	Central
Gross Bldg Area	8562
Total Living Area	4559

Report Created On 1/16/2017

Town of Newtown, CT
Property Listing Report

Map Block Lot 13-1-14

Account 00038000

Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	561760	393230
Outbuildings	39400	27580
Improvements	601160	420810
Extras	0	0
Land	138600	97030
Total	739760	517840

Outbuilding and Extra Items

Type	Description
2S Barn	224 S.F.
Inground Pool - Custom	760 S.F.
2S Barn	1800 S.F.
Garage w/ Loft	928 S.F.

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	2893	2893
Basement	2893	0
Open Porch	478	0
Finished Upper Story	1666	1666
Patio	632	0
Total Area		

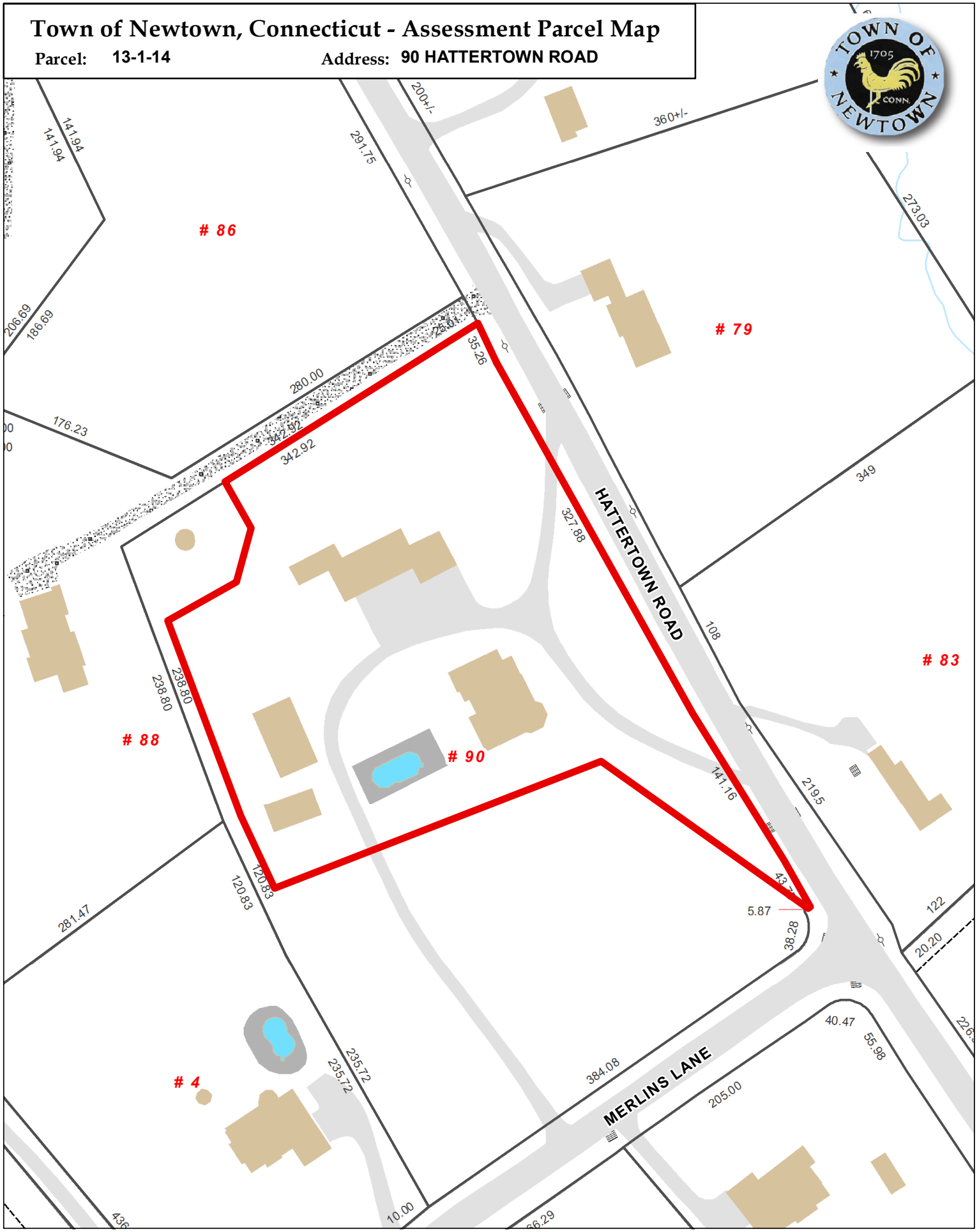
Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
CAVALIERE LINDA	0729/0073	12/25/2009	

Report Created On 1/16/2017

Town of Newtown, Connecticut - Assessment Parcel Map

Parcel: 13-1-14 **Address:** 90 HATTERTOWN ROAD



Approximate Scale:

0 25 50 75 100 Feet

N W E S

Disclaimer: This map is for informational purposes only. All information is subject to verification by any user. The Town of Newtown and its mapping contractors assume no legal responsibility for the information contained herein.

Map Produced Oct 2016

Exhibit C

ANTENNA UPGRADES
BY

T··Mobile·

T-MOBILE NORTHEAST LLC

SITE NUMBER: CTFF626A
SITE NAME: CT626/Hattertown Rd silo
SITE ADDRESS: 90 Hattertown Rd, Newtown CT 06470

(704G CONFIGURATION)

PROJECT SCOPE:

T-MOBILE, A WIRELESS TELECOMMUNICATIONS PROVIDER PROPOSES TO UPGRADE THEIR EXISTING FACILITY AS FOLLOWS:
REMOVE: (3) ANTENNAS
ADD: (3) ANTENNAS, (3) SMART BIAS TEE, (6) COAX CABLES AND (1) BACKUP BATTERY UNIT.

PROJECT NOTES:

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION: HANDICAPPED ACCESS IS NOT REQUIRED. POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED. NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACES THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
3. DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES, ORDINANCES AND SPECIFICATIONS.

APPLICABLE STATE ADOPTION CODES:

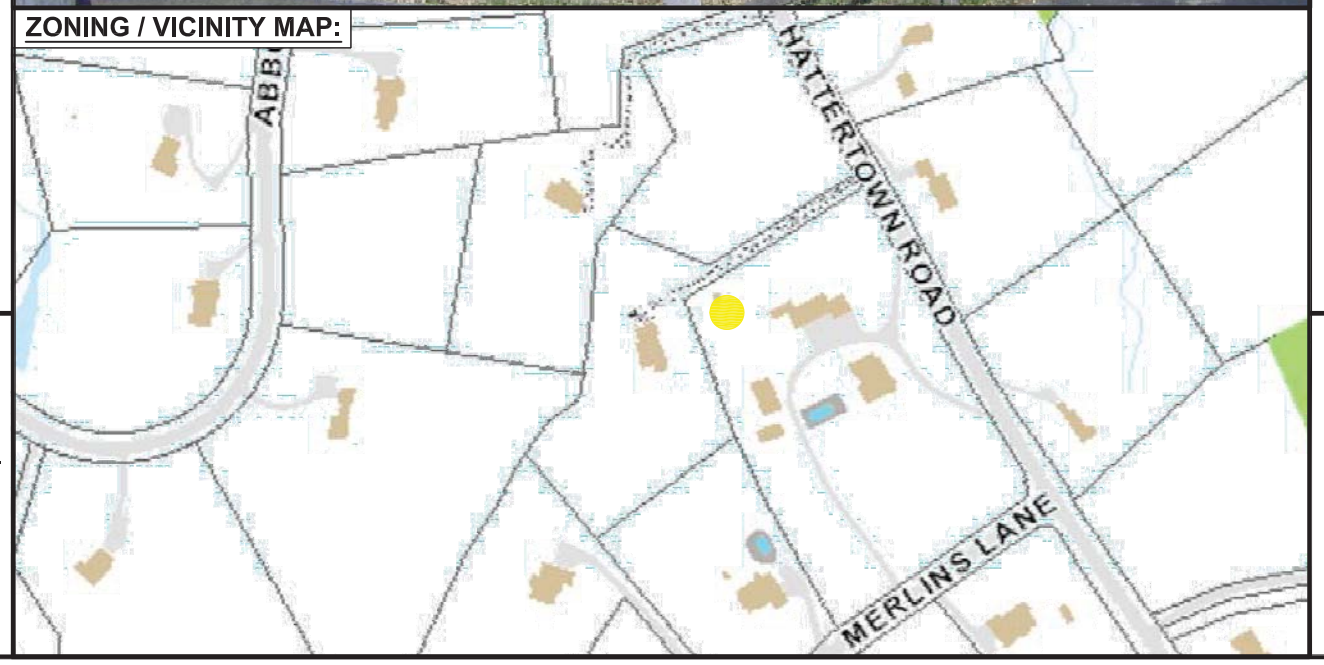
2016 CONNECTICUT STATE BUILDING CODE (CSBC).

ANSI/TIA-222-G-2005 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

2014 NATIONAL ELECTRICAL CODE (NFPA 70) FOR POWER AND GROUNDING REQUIREMENTS.

SITE IMAGE:

ZONING / VICINITY MAP:



PROJECT INFORMATION:

ADDRESS:	90 HATTERTOWN RD NEWTOWN CT 06470
STRUCTURE TYPE:	POLE INSIDE A SILO
ZONING DISTRICT:	R-1
COORDINATES:	N 41.36329167 , W-73.32923330
STRUCTURE HEIGHT:	59'-0" AGL

PROJECT TEAM:

APPLICANT:	T-MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 860-692-7100
LANDLOARD:	LINDA CAVALIERE 90 HATTERTOWN RD NEWTOWN CT 06470
DEVELOPER:	NORTHEAST SITE SOLUTIONS 199 BRICKYARD RD FARMINGTON, CT 06032 SHELDON FREINCLE SHELDON@NORTHEASTSITE SOLUTIONS.COM 203-376-9186
CONSULTANTS:	FORESITE LLC 462 WALNUT ST NEWTON, MA 02460 SAEED MOSSAVAT SMOSSAVAT@FORESITELLC.COM 617-212-3123

SHEET INDEX:

APPLICANT:
T··Mobile·
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

TURNKEY DEVELOPER:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Developments
199 Brickyard road
Farmington, CT 06032
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 Walnut street
Newton, MA 02460
617-212-3123

STATE OF CONNECTICUT
JAMES P. STROKE
No. 8657
REGISTERED PROFESSIONAL ENGINEER

REV	DESCRIPTION	DATE
A	PRELIMINARY	01/05/17
0	ISSUED FOR PERMITTING	01/10/17

SITE NUMBER: CTFF626A
SITE NAME: CT626/Hattertown Rd silo
SITE ADDRESS: 90 Hattertown Rd, Newtown CT 06470

SHEET TITLE:
T-1: TITLE SHEET

NOTES AND DISCLAIMERS:

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

2. THE ARCHITECT/ENGINEER HAS MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE CLIENT'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.

5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.

6. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S / VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

7. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS DURING CONSTRUCTION.

8. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJEC

9. THE CONTRACTOR SHALL NOTIFY THE CLIENT'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE CLIENT'S REPRESENTATIVE.

10. THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

A. ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS, AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS BUILDING CODES" OR LATEST EDITION.

B. AWS: AMERICAN WELDING SOCIETY INC. AS PUBLISHED IN "STANDARD D1.1–08, STRUCTURAL WELDING CODE" OR LATEST EDITION.

C. AISC: AMERICAN INSTITUTE FOR STEEL CONSTRUCTION AS PUBLISHED IN "CODE FOR STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"; "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).

11. BOLTING:

A. BOLTS SHALL BE CONFORMING TO ASTM A325 HIGH STRENGTH, HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.

B. BOLTS SHALL BE 3/4"ø MINIMUM (UNLESS OTHERWISE NOTED)

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

12. FABRICATION:

A. FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS STANDARDS AND CODES (LATEST EDITION).

B. ALL STRUCTURAL STEEL SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 (LATEST EDITION), UNLESS OTHERWISE NOTED.

13. ERECTION OF STEEL:

A. PROVIDE ALL ERECTION EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION BUT ARE NECESSARY FOR ITS PROPER ERECTION.

B. ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED LINES AND ELEVATIONS AND RIGIDLY FASTENED IN PLACE WITH SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING.

C. TEMPORARY BRACING, GUYING AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SAFE AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.

14. ANTENNA INSTALLATION:

A. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

B. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

C. INSTALL COAXIAL / FIBER CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

15. ANTENNA AND COAXIAL / FIBER CABLE GROUNDING:

A. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE #221213 OR EQUAL.

B. ALL COAXIAL / FIBER CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL / FIBER CABLE (NOT WITHIN BENDS).

16. RELATED WORK, FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH OTHER TRADES PRIOR TO BID:

A. FLASHING OF OPENING INTO OUTSIDE WALLS

B. SEALING AND CAULKING ALL OPENINGS

C. PAINTING

D. CUTTING AND PATCHING

17. REQUIREMENTS OF REGULATORY AGENCIES:

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATION IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES, AND SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

C. TIA–EIA – 222 (LATEST EDITION). STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

D. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7460–IH, OBSTRUCTION MARKING AND LIGHTING.

E. FCC – FEDERAL COMMUNICATIONS COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES AND FORM 715A, HIGH INTENSITY OBSTRUCTION LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES.

F. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS (LATEST EDITION).

G. NEC – NATIONAL ELECTRICAL CODE – ON TOWER LIGHTING KITS.

H. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

I. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

J. 2009 LIFE SAFETY CODE NFPA – 101.

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

TURNKEY DEVELOPER:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 Brickyard road
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CONSULTANT:
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Architects . Engineers . Surveyors
462 Walnut street
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617-212-3123

REV	DESCRIPTION	DATE
A	PRELIMINARY	01/05/17
0	ISSUED FOR PERMITTING	01/10/17

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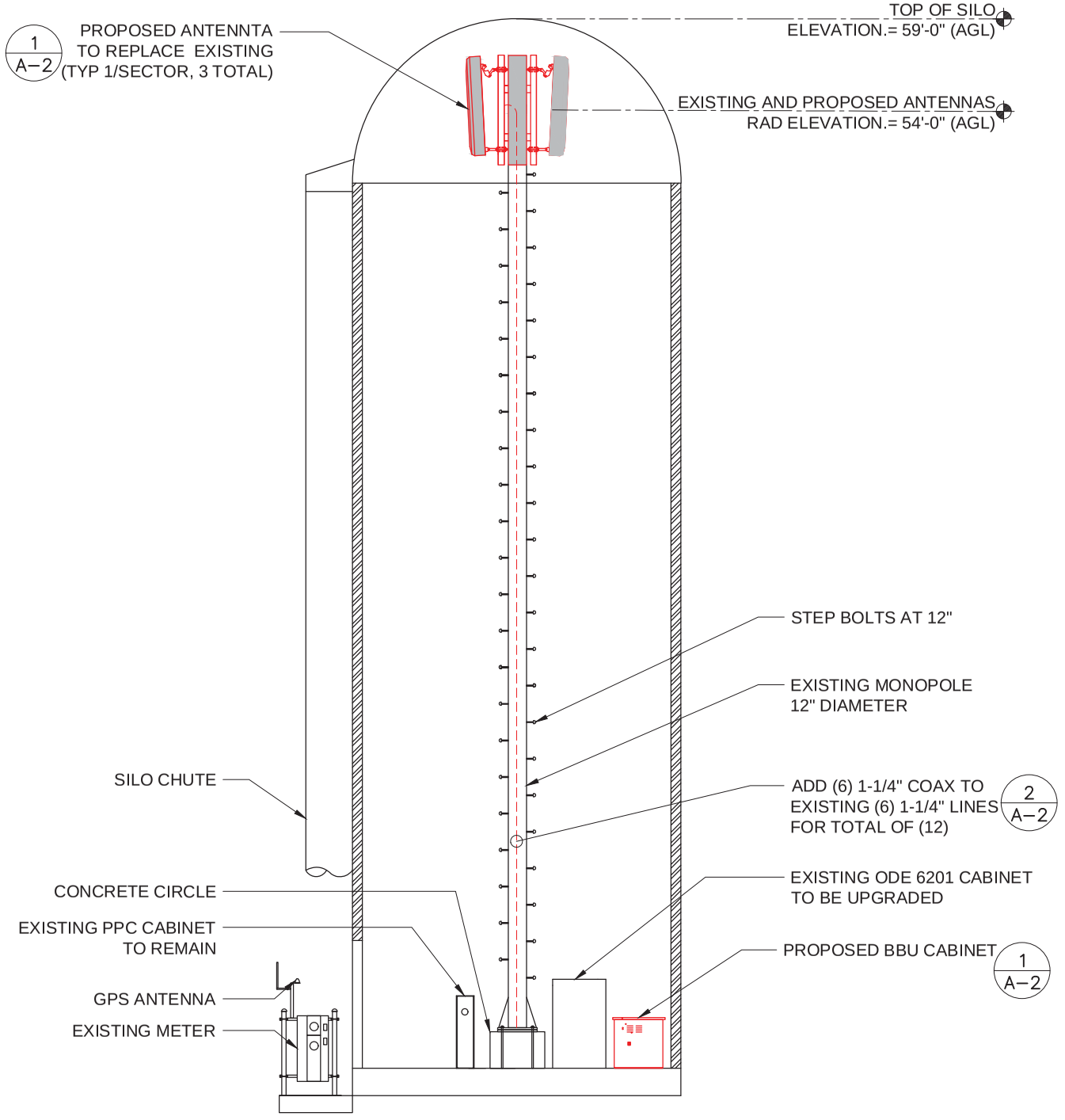
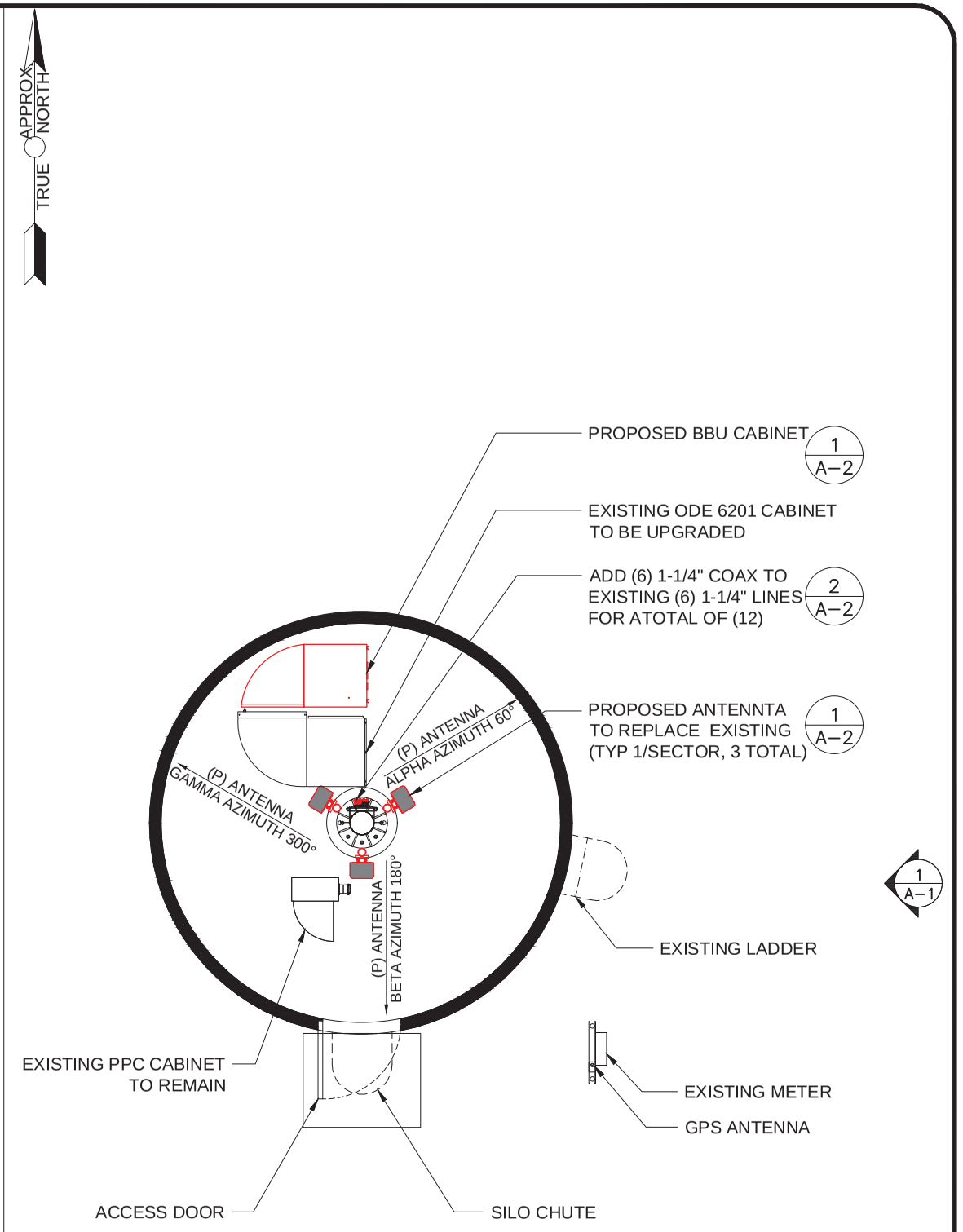
SITE ADDRESS: 90 Hattertown Rd, Newtown CT 06470

SHEET TITLE:
N-1: NOTES AND DISCLAIMERS



ELEVATION
SCALE 1"=100'
1
A–1



PLAN
SCALE 1"=80'
2
A–1

APPLICANT:
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

TURNKEY DEVELOPER:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 Brickyard road
Farmington, CT 06032
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CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 Walnut street
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STATE OF CONNECTICUT
JAMES P. STROKE
No. 8657
REGISTERED PROFESSIONAL ENGINEER

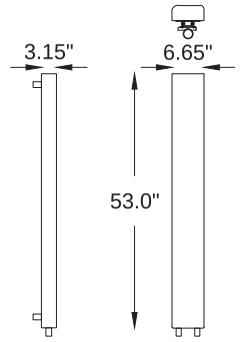
REV	DESCRIPTION	DATE
A	PRELIMINARY	01/05/17
0	ISSUED FOR PERMITTING	01/10/17

SITE NUMBER: CTFF626A
SITE NAME: CT626/Hattertown Rd silo
SITE ADDRESS: 90 Hattertown Rd, Newtown CT 06470

SHEET TITLE:
A-1: PLANS AND ELEVATIONS

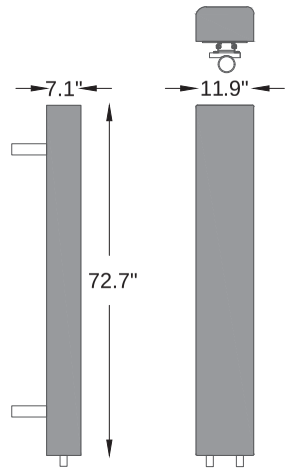
REMOVE:
(3) ANTENNAS

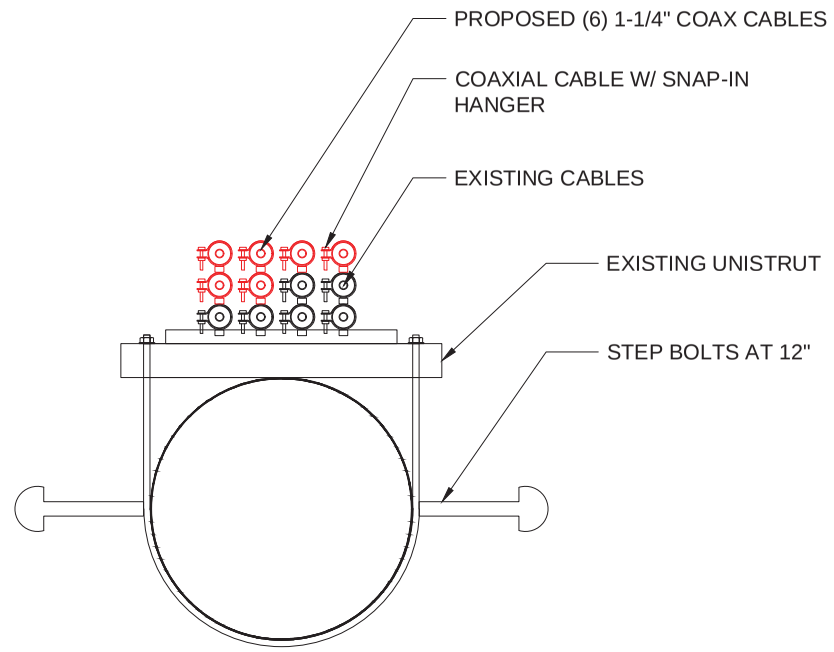
Manufacturer:	RFS
Model:	APX18D-209015-C
Footprint:	53.0"Hx6.65"Wx3.15"D
weight:	34.1 lbs



ADD:
(3) ANTENNAS

Manufacturer:	COMMSCOPE
Model	DBXNH-6565A-A2M
Footprint:	72.7"Hx11.9"Wx7.1"D
weight:	46.3 lbs
Frequency band	698-896 MHZ
Antenna type	Single Sector
Wind loading lateral	150 km/h
Wind loading rear	150 km/h
Wind loading maximum	241 km/h

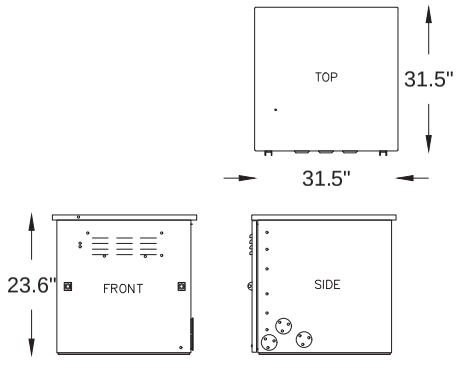




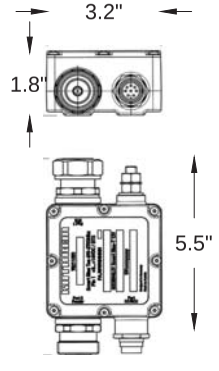
VERTICAL COAXIAL CABLE SUPPORT 2 A–2
N.T.S

ADD:
(1) BATTERY BACKUP UNIT

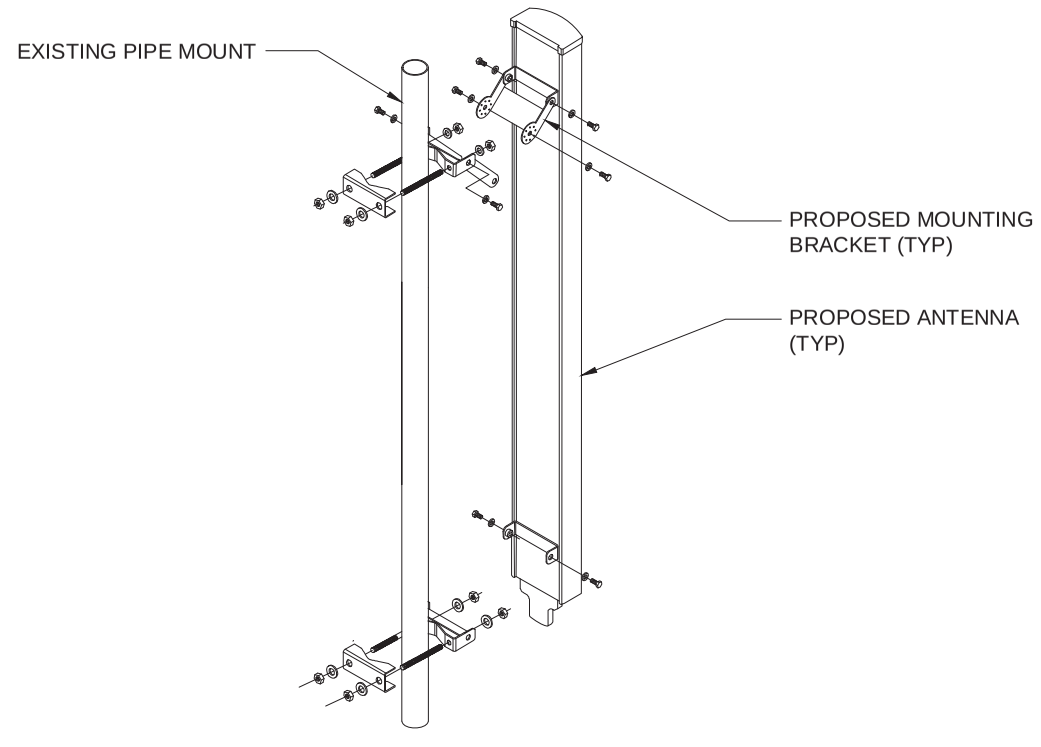
Manufacturer:	ALCATEL LUCENT
Footprint:	30.55"Hx30.55"Wx29.67"D
weight:	100 lbs



ADD:
(3) SMART BIAS TEES AT ANTENNA LEVEL



ANTENNA AND EQUIPMENT DETAILS 1 A–2
N.T.S



ANTENNA MOUNTING DETAIL 3 A–2
N.T.S

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

TURNKEY DEVELOPER:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 Brickyard road
Farmington, CT 06032
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 Walnut street
Newton, MA 02460
617-212-3123

STATE OF CONNECTICUT
JAMES P. STROKE
No. 8657
REGISTERED PROFESSIONAL ENGINEER

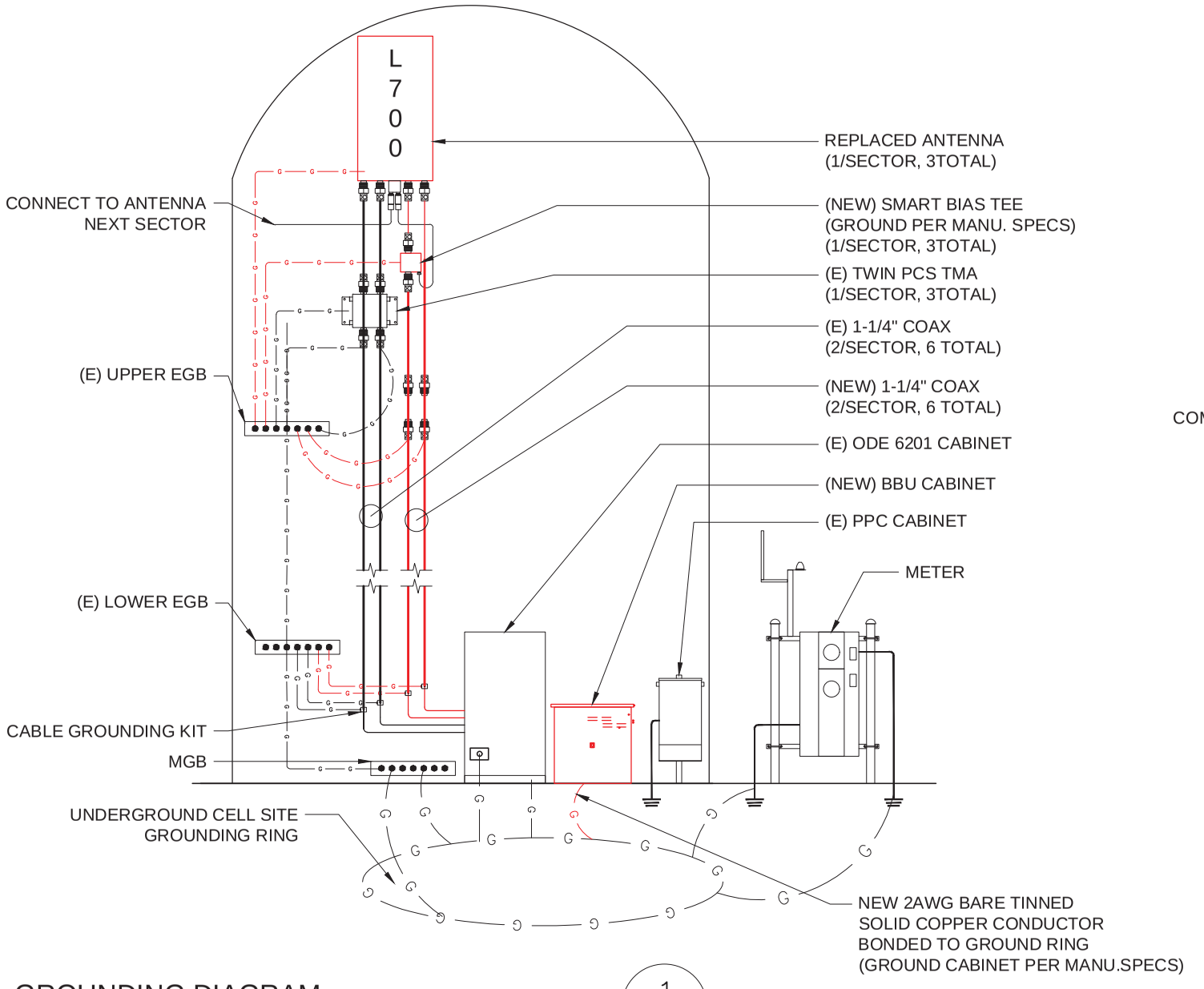
REV	DESCRIPTION	DATE
A	PRELIMINARY	01/05/17
0	ISSUED FOR PERMITTING	01/10/17

SITE NUMBER: CTFF626A
SITE NAME: CT626/Hattertown Rd silo
SITE ADDRESS: 90 Hattertown Rd, Newtown CT 06470

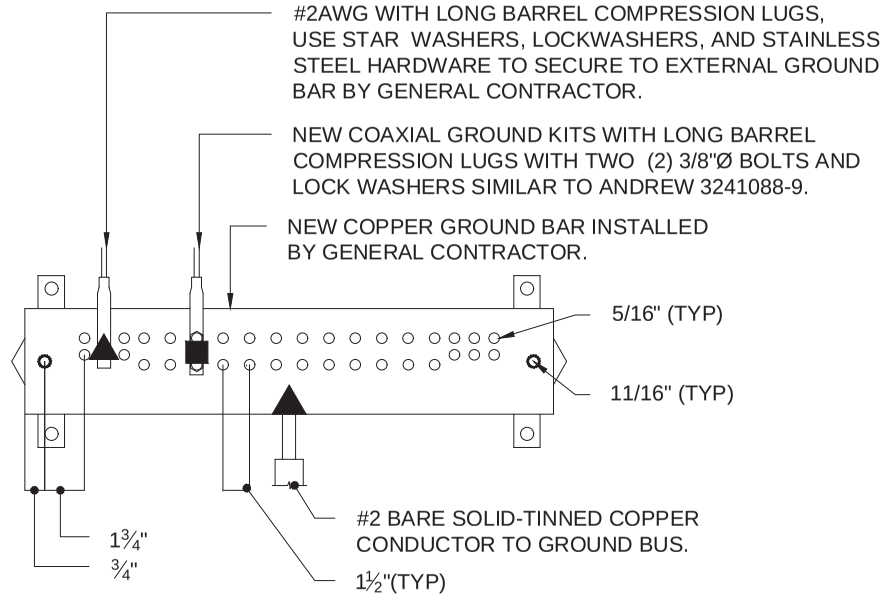
SHEET TITLE:
A-2: ANTENNAS, EQUIPMENT AND DETAILS

NOTES TO CONTRACTOR

1. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY ALL APPLICABLE CODES.
2. ALL GROUNDING WORK SHALL BE IN ACCORDANCE WITH T-MOBILE STANDARD PRACTICE.
3. ALL BUS CONNECTORS SHALL BE TWO-HOLE, LONG-BARREL TYPE COMPRESSION LUGS, T&B OR EQUAL, UNLESS OTHERWISE NOTED ON DRAWINGS. ALL LUGS SHALL BE ATTACHED TO BUSSES USING BOLTS, NUTS, AND LOCK WASHERS. NO WASHERS ARE ALLOWED BETWEEN THE ITEMS BEING GROUNDED.
4. ALL CONNECTORS SHALL BE CRIMPED USING HYDRAULIC CRIMPING TOOLS, T&B #TBM 8 OR EQUIVALENT.
5. ALL CONNECTIONS SHALL BE MADE TO BARE METAL. ALL PAINTED SURFACES SHALL BE FILED TO ENSURE PROPER CONTACT . NO WASHERS ARE ALLOWED BETWEEN THE ITEMS BEING GROUNDED. ALL CONNECTIONS ARE TO HAVE A NON-OXIDIZING AGENT APPLIED PRIOR TO INSTALLAT ION.
6. ALL COPPER BUSSES SHALL BE CLEANED, POLISHED, AND A NON-OXIDIZING AGENT APPLIED. NO FINGERPRINTS OR DISCOLORED COPPER WILL BE PERMITTED.
7. ALL BENDS SHALL BE AS SHALLOW AS POSSIBLE, WITH NO TURN SHORTER THAN AN 8-INCH NOMINAL
8. GROUNDING CONDUCTORS SHALL BE SOLID TINNED COPPER AND ANNEALED #2. ALL GROUNDING CONDUCTORS SHALL RUN THROUGH PVC SLEEVES WHEREVER CONDUCTORS RUN THROUGH WALLS, FLOORS, OR CEILINGS. IF CONDUCTORS MUST RUN THROUGH EMT, BOTH ENDS OF CONDUIT SHALL BE GROUNDED. SEAL BOTH ENDS OF CONDUIT WITH SILICONE CAULK.
9. GROUNDING SYSTEM RESISTANCE SHALL NOT EXCEED 10 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY THE PROJECT MANAGER FOR FURTHER INSTRUCTION ON METHODS FOR REDUCING THE RESISTANCE
10. ALL ROOF TOP ANTENNA MOUNTS SHALL BE GROUNDED WITH A #2 GROUND WIRE CONNECTED TO THE NEAREST GROUND BUS. ALL CONNECTIONS ARE TO BE CAD-WELDED IF POSSIBLE.
11. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL. SUBMIT TEST REPORTS TO THE PROJECT MANAGER.
12. GROUNDING CONNECTION TO TRAVEL IN A DOWNWARD DIRECTION.
13. ALL EXPOSED #2 WIRE MUST BE TINN NOT BTW.

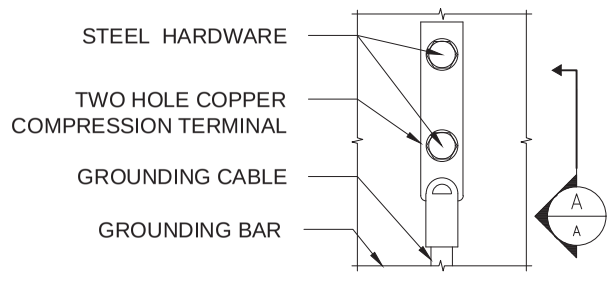


GROUNDING DIAGRAM
SCALE: N.T.S
1
E–1

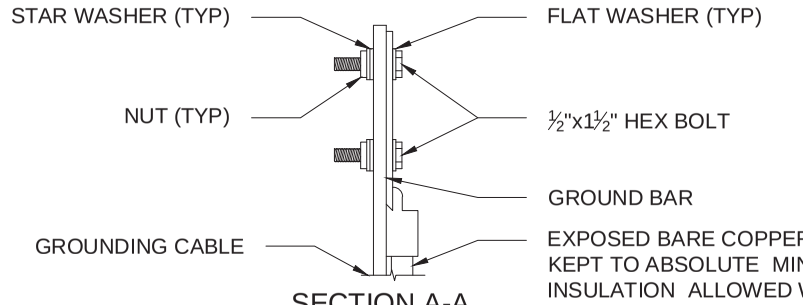


NOTES:
1. ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
3. ALL HOLES ARE COUNTERSUNK 1/16".

GROUND BAR DETAILS
SCALE: N.T.S
2
E–1



ELEVATION



SECTION A-A

NOTES:
1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

TYPICAL GROUND BAR CONNECTIOS DETAIL
SCALE: N.T.S
3
E–1

APPLICANT:
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

TURNKEY DEVELOPER:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 Brickyard road
Farmington, CT 06032
203-275-6669

CONSULTANT:
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Architects . Engineers . Surveyors
462 Walnut street
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STATE OF CONNECTICUT
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REV	DESCRIPTION	DATE
A	PRELIMINARY	01/05/17
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SITE NUMBER: CTFF626A
SITE NAME: CT626/Hattertown Rd silo
SITE ADDRESS: 90 Hattertown Rd, Newtown CT 06470

SHEET TITLE:
E-1: GROUNDING DETAILS

Exhibit D

Structural Analysis report

Date: January 6, 2017

Site Number: CTFF626A
Site Name: CT626/Hattertown Rd. Silo

Site Address:
90 Hattertown Road
Newtown, CT 06477

PREPARED FOR:

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

CONSULTANT:

FORESITE LLC
Architects . Engineers . Surveyors

462 Walnut street
Newton, MA 02460
Contact: Saeed Mossavat
email:smossavat@Foresitellc.com
617-527-3031

TURNKEY DEVELOPER:

NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

199 Brickyard road
Farmington, CT 06032
Contact: Sheldon Freincle
sheldon@northeastsitesolution.com
203-275-6669

STRUCTURAL ANALYSIS REPORT – REV.1
MONOPOLE

Prepared For:

T-Mobile Northeast, LLC
35 Griffin Road South
Bloomfield, CT 06002

Structure Rating	
Monopole:	**Pass (76.5%)**
Foundation:	**Pass (54.4%)**

Sincerely,
Destek Engineering, LLC
License No: PEC0001429

01/09/2017

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

Site Name: CT626/Hattertown Rd. Silo
Site ID: CTFF626A
90 Hattertown Road
Newtown, CT 06477

Destek Job No: 1675007

January 09, 2017

CONTENTS

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 -Tel: (770) 693-0835

1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the existing 59' monopole located inside the silo at 90 Hattertown Road, Newtown, CT 06477 for the additions and alterations proposed by T-Mobile.

The structural analysis is based on the following documentation provided to Destek Engineering, LLC (Destek):

- RFDS provided by T-Mobile, dated 12/01/2016.
- Structural Analysis report prepared by URS Corp., dated 03/28/2007.
- Tower construction drawings prepared by URS Corp., dated 03/28/2007.

1.1 STRUCTURE

The structure is a 59' monopole consisting of (1) round tube section. The monopole tower is attached to the foundation with a base plate and anchor bolts. It is formed by the following sections:

Section Length (Feet)	Shaft Thickness (Inches)	Top Diameter (Inches)	Bottom Diameter (Inches)	Yield Strength (ksi)
59.00	0.25	12.000	12.000	35

2.0 EXISTING AND PROPOSED APPURTENANCES

Existing Configuration of T-Mobile Appurtenances:

Rad Center (ft.)	Antennas & Equipment	Coax	Mount
54	(3) APXV18-209015-C (3) TMA – 1A - Twin PCS	(6) 1-1/4	(3) Mount Pipe

Proposed and Final Configuration of T-Mobile Appurtenances:

Rad Center (ft.)	Antennas & Equipment	Coax	Mount
54	(3) DBXNH-6565A-A2M (3) TMA – 1A - Twin PCS (3) Smart Bias Tee	(12) 1-1/4	(3) Mount Pipe

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 -Tel: (770) 693-0835

3.0 CODES AND LOADING

The monopole was analyzed per *TIA/EIA-222-G* as referenced by the *2016 State Building Code* with all of the adopted Addendums and Supplements. The following wind loading was used in compliance with the standard for Newtown, CT:

- Ultimate wind speed 120 mph converted to a Basic wind speed 93 mph without ice (W_0)
- Basic wind speed 50 mph with 3/4" escalating ice (W_i)
- Exposure Category C
- Topographic Category 1
- Structure Class II (I_w = 1.0)

The following load combinations were used with wind blowing at 0°, 30°, 45°, 60°, and 90° measured from a line normal to the face of the tower.

- 1.2 D + 1.6 W_0
- 0.9 D + 1.6 W_0
- 1.2 D + 1.0 D_i + 1.0 W_i

D: Dead Load of structure and appurtenances
W_0: Wind Load, without ice
W_i: Wind Load, with ice
D_i: Weight of Ice

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 -Tel: (770) 693-0835

4.0 STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES

The analysis is based on the information provided and is assumed to be current and correct. Unless otherwise noted, the structure is assumed to be in good condition, free of defects and can achieve theoretical strength.

It is assumed that the structure has been maintained and shall be maintained during its service. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. Destek will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance.

The analysis does not include a qualification of the mounts attached on the structure or their connections. The analysis is performed to verify the capacity of the main structural members, which is the current practice in the tower industry.

The analysis results presented in this report are only applicable for the previously mentioned existing and proposed appurtenances. Any deviation of the appurtenances and placement, etc., will require Destek to generate an additional structural analysis.

5.0 ANALYSIS AND ASSUMPTIONS

The tower was analyzed by utilizing tnxTower, a 3-Dimensional finite element software, a product of Tower Numerics, Inc. Software output for this analysis is provided in Appendix-A of this report.

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 -Tel: (770) 693-0835

6.0 CONCLUSION AND RESULTS

Based on an analysis per *TIA/EIA-222-G*, the existing tower has **adequate** structural capacity for the proposed modifications by T-Mobile. For the code specified load combinations and as a maximum, the tower shaft is stressed to **76.5%** of capacity. The anchor rods are stressed to **33.2%** of capacity. The base plate is stressed to **31.7%** of capacity. Based on a reaction comparison, the tower foundation is also found to have **adequate** capacity to support the proposed changes.

Reaction Comparison:

Maximums	Destek Analysis	URS Corp Design*
Base Shear (kips)	4	6*1.35=8.1
Overturning Moment (kip-ft)	149	203*1.35=274.1

*The original tower analysis reactions were multiplied by 1.35 in accordance with Chapter 15.5.1 of revision G, for comparison purposes.

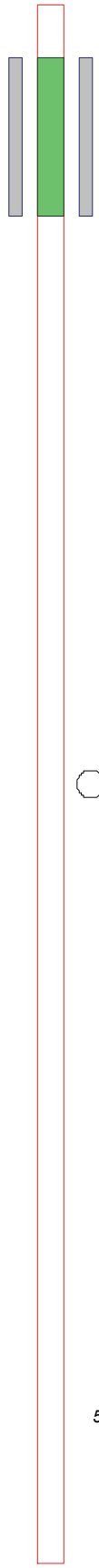
Therefore, the proposed additions and alterations by T-Mobile **can** be implemented as intended with the conditions outlined in this report.

Should you have any questions about this report, please contact us at (770) 693-0835.

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 -Tel: (770) 693-0835

APPENDIX A
SOFTWARE OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P12x.5	59.00	A53-B-35	3.9
				3.9



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Generic Style 1A - Twin PCS	54	DBXNH-6565A-R2M w/ Mount Pipe	54
Generic Style 1A - Twin PCS	54	Smart Bias Tee	54
Generic Style 1A - Twin PCS	54	Smart Bias Tee	54
DBXNH-6565A-R2M w/ Mount Pipe	54	Smart Bias Tee	54
DBXNH-6565A-R2M w/ Mount Pipe	54		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 76.5%

ALL REACTIONS ARE FACTORED

AXIAL 11 K

SHEAR 1 K *MOMENT 43 kip-ft*

TORQUE 0 kip-ft

50 mph WIND - 0.7500 in ICE

AXIAL 5 K

SHEAR 4 K *MOMENT 149 kip-ft*

TORQUE 0 kip-ft

REACTIONS - 93 mph WIND

Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
Phone: (770) 693-0835
FAX:

Job: ***CTFF626A***			
Project: ***1675007***			
Client: Foresite LLC	Drawn by: Ahmet Colakoglu		App'd:
Code: TIA-222-G	Date: 01/09/17		Scale: NTS
Path: Z:\Projects\2016\75 - Foresite LLC\007 - CTFF626A (Monopole)\Revision 010917\TNX\CTFF626A.er			Dwg No. E-1

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 93 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	59.00-0.00	59.00	P12x.5	A53-B-35 (35 ksi)	

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 59.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight plf
LDF6-50A (1-1/4 FOAM)	C	No	CaAa (Out Of Face)	54.00 - 0.00	2	No Ice	0.16	0.66
						1/2" Ice	0.25	1.91
						1" Ice	0.35	3.78
LDF6-50A (1-1/4 FOAM)	C	No	CaAa (Out Of Face)	54.00 - 0.00	10	No Ice	0.00	0.66
						1/2" Ice	0.00	1.91
						1" Ice	0.00	3.78

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L1	59.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	16.740	0.43

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L1	59.00-0.00	A	1.491	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	48.955	4.22

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	59.00-0.00	-0.2909	0.1680	-0.5350	0.3089

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Generic Style 1A - Twin PCS	A	From Face	1.00	0.0000	54.00	No Ice	0.58	0.26	0.01
			0.00			1/2" Ice	0.67	0.34	0.02
			0.00			1" Ice	0.78	0.42	0.02
Generic Style 1A - Twin PCS	B	From Face	1.00	0.0000	54.00	No Ice	0.58	0.26	0.01
			0.00			1/2" Ice	0.67	0.34	0.02
			0.00			1" Ice	0.78	0.42	0.02
Generic Style 1A - Twin PCS	C	From Face	1.00	0.0000	54.00	No Ice	0.58	0.26	0.01
			0.00			1/2" Ice	0.67	0.34	0.02
			0.00			1" Ice	0.78	0.42	0.02
DBXNH-6565A-R2M w/ Mount Pipe	A	From Face	1.00	0.0000	54.00	No Ice	5.69	4.83	0.06
			0.00			1/2" Ice	6.10	5.52	0.11
			0.00			1" Ice	6.52	6.18	0.16
DBXNH-6565A-R2M w/ Mount Pipe	B	From Face	1.00	0.0000	54.00	No Ice	5.69	4.83	0.06
			0.00			1/2" Ice	6.10	5.52	0.11
			0.00			1" Ice	6.52	6.18	0.16
DBXNH-6565A-R2M w/ Mount Pipe	C	From Face	1.00	0.0000	54.00	No Ice	5.69	4.83	0.06
			0.00			1/2" Ice	6.10	5.52	0.11
			0.00			1" Ice	6.52	6.18	0.16
Smart Bias Tee	A	From Face	1.00	0.0000	54.00	No Ice	0.15	0.08	0.00
			0.00			1/2" Ice	0.20	0.13	0.00
			0.00			1" Ice	0.26	0.18	0.01
Smart Bias Tee	B	From Face	1.00	0.0000	54.00	No Ice	0.15	0.08	0.00
			0.00			1/2" Ice	0.20	0.13	0.00
			0.00			1" Ice	0.26	0.18	0.01
Smart Bias Tee	C	From Face	1.00	0.0000	54.00	No Ice	0.15	0.08	0.00
			0.00			1/2" Ice	0.20	0.13	0.00
			0.00			1" Ice	0.26	0.18	0.01

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 59.00-0.00	31.16	0.99	20	62.688	A	0.000	62.688	62.688	100.00	0.000	0.000
					B	0.000	62.688		100.00	0.000	0.000
					C	0.000	62.688		100.00	0.000	16.740

Tower Pressure - With Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 59.00-0.00	31.16	0.99	6	1.4914	77.353	A	0.000	77.353	77.353	100.00	0.000	0.000
						B	0.000	77.353		100.00	0.000	0.000
						C	0.000	77.353		100.00	0.000	48.955

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 59.00-0.00	31.16	0.99	8	62.688	A	0.000	62.688	62.688	100.00	0.000	0.000
					B	0.000	62.688		100.00	0.000	0.000
					C	0.000	62.688		100.00	0.000	16.740

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 59.00-0.00	0.43	3.86	A	1	1.2	20	1	1	62.688	2.04	34.55	C
			B	1	1.2		1	1	62.688			
			C	1	1.2		1	1	62.688			
Sum Weight:	0.43	3.86						OTM	63.53 kip-ft	2.04		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 59.00-0.00	0.43	3.86	A	1	1.2	20	1	1	62.688	2.04	34.55	C
			B	1	1.2		1	1	62.688			
			C	1	1.2		1	1	62.688			
Sum Weight:	0.43	3.86						OTM	63.53 kip-ft	2.04		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 59.00-0.00	0.43	3.86	A	1	1.2	20	1	1	62.688	2.04	34.55	C
			B	1	1.2		1	1	62.688			
			C	1	1.2		1	1	62.688			
Sum Weight:	0.43	3.86						OTM	63.53 kip-ft	2.04		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 59.00-0.00	4.22	5.39	A	1	1.2	6	1	1	77.353	0.91	15.40	C
			B	1	1.2		1	1	77.353			
			C	1	1.2		1	1	77.353			
Sum Weight:	4.22	5.39						OTM	28.31 kip-ft	0.91		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 59.00-0.00	4.22	5.39	A	1	1.2	6	1	1	77.353	0.91	15.40	C
			B	1	1.2		1	1	77.353			
			C	1	1.2		1	1	77.353			
Sum Weight:	4.22	5.39						OTM	28.31 kip-ft	0.91		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 59.00-0.00	4.22	5.39	A	1	1.2	6	1	1	77.353	0.91	15.40	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			B	1	1.2		1	1	77.353			
			C	1	1.2		1	1	77.353			
Sum Weight:	4.22	5.39						OTM	28.31 kip-ft	0.91		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 59.00-0.00	0.43	3.86	A	1	1.2	8	1	1	62.688	0.76	12.87	C
			B	1	1.2		1	1	62.688			
			C	1	1.2		1	1	62.688			
Sum Weight:	0.43	3.86						OTM	23.66 kip-ft	0.76		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 59.00-0.00	0.43	3.86	A	1	1.2	8	1	1	62.688	0.76	12.87	C
			B	1	1.2		1	1	62.688			
			C	1	1.2		1	1	62.688			
Sum Weight:	0.43	3.86						OTM	23.66 kip-ft	0.76		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 59.00-0.00	0.43	3.86	A	1	1.2	8	1	1	62.688	0.76	12.87	C
			B	1	1.2		1	1	62.688			
			C	1	1.2		1	1	62.688			
Sum Weight:	0.43	3.86						OTM	23.66 kip-ft	0.76		

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	59 - 0	Pole	Max Tension	36	0.00	-0.00	0.00
			Max. Compression	26	-11.37	2.12	-1.22
			Max. Mx	20	-5.40	148.98	-0.14
			Max. My	14	-5.40	0.24	-148.87
			Max. Vy	20	-4.07	148.98	-0.14
			Max. Vx	14	4.07	0.24	-148.87
			Max. Torque	25			0.31

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	29	11.37	-0.95	0.55
	Max. H_x	21	4.06	4.05	-0.00
	Max. H_z	3	4.06	0.00	4.05
	Max. M_x	2	148.59	0.00	4.05
	Max. M_z	8	148.49	-4.05	-0.00
	Max. Torsion	25	0.31	2.03	3.51
	Min. Vert	21	4.06	4.05	-0.00
	Min. H_x	9	4.06	-4.05	-0.00
	Min. H_z	15	4.06	0.00	-4.05
	Min. M_x	14	-148.87	0.00	-4.05
	Min. M_z	20	-148.98	4.05	-0.00
	Min. Torsion	13	-0.31	-2.03	-3.51

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	4.51	0.00	0.00	0.11	0.20	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	5.41	-0.00	-4.05	-148.59	0.24	-0.27
0.9 Dead+1.6 Wind 0 deg - No Ice	4.06	-0.00	-4.05	-147.50	0.18	-0.27
1.2 Dead+1.6 Wind 30 deg - No Ice	5.41	2.03	-3.51	-128.67	-74.12	-0.16
0.9 Dead+1.6 Wind 30 deg - No Ice	4.06	2.03	-3.51	-127.73	-73.62	-0.16
1.2 Dead+1.6 Wind 60 deg - No Ice	5.41	3.51	-2.03	-74.23	-128.56	-0.00
0.9 Dead+1.6 Wind 60 deg - No Ice	4.06	3.51	-2.03	-73.70	-127.65	-0.00
1.2 Dead+1.6 Wind 90 deg - No Ice	5.41	4.05	0.00	0.14	-148.49	0.16
0.9 Dead+1.6 Wind 90 deg - No Ice	4.06	4.05	0.00	0.10	-147.42	0.16
1.2 Dead+1.6 Wind 120 deg - No Ice	5.41	3.51	2.03	74.51	-128.57	0.27
0.9 Dead+1.6 Wind 120 deg - No Ice	4.06	3.51	2.03	73.91	-127.65	0.27
1.2 Dead+1.6 Wind 150 deg -	5.41	2.03	3.51	128.95	-74.12	0.31

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
No Ice						
0.9 Dead+1.6 Wind 150 deg - No Ice	4.06	2.03	3.51	127.93	-73.62	0.31
1.2 Dead+1.6 Wind 180 deg - No Ice	5.41	-0.00	4.05	148.87	0.24	0.27
0.9 Dead+1.6 Wind 180 deg - No Ice	4.06	-0.00	4.05	147.71	0.18	0.27
1.2 Dead+1.6 Wind 210 deg - No Ice	5.41	-2.03	3.51	128.95	74.61	0.16
0.9 Dead+1.6 Wind 210 deg - No Ice	4.06	-2.03	3.51	127.93	73.98	0.16
1.2 Dead+1.6 Wind 240 deg - No Ice	5.41	-3.51	2.03	74.51	129.05	-0.00
0.9 Dead+1.6 Wind 240 deg - No Ice	4.06	-3.51	2.03	73.91	128.01	-0.00
1.2 Dead+1.6 Wind 270 deg - No Ice	5.41	-4.05	0.00	0.14	148.98	-0.16
0.9 Dead+1.6 Wind 270 deg - No Ice	4.06	-4.05	0.00	0.10	147.79	-0.16
1.2 Dead+1.6 Wind 300 deg - No Ice	5.41	-3.51	-2.03	-74.23	129.05	-0.27
0.9 Dead+1.6 Wind 300 deg - No Ice	4.06	-3.51	-2.03	-73.70	128.01	-0.27
1.2 Dead+1.6 Wind 330 deg - No Ice	5.41	-2.03	-3.51	-128.67	74.61	-0.31
0.9 Dead+1.6 Wind 330 deg - No Ice	4.06	-2.03	-3.51	-127.73	73.98	-0.31
1.2 Dead+1.0 Ice+1.0 Temp	11.37	0.00	-0.00	1.22	2.12	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	11.37	0.00	-1.09	-39.64	2.14	-0.14
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	11.37	0.55	-0.95	-34.16	-18.30	-0.08
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	11.37	0.95	-0.55	-19.20	-33.26	-0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	11.37	1.09	-0.00	1.23	-38.73	0.08
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	11.37	0.95	0.55	21.67	-33.26	0.14
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	11.37	0.55	0.95	36.63	-18.30	0.17
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	11.37	0.00	1.09	42.11	2.14	0.14
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	11.37	-0.55	0.95	36.63	22.57	0.08
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	11.37	-0.95	0.55	21.67	37.53	-0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	11.37	-1.09	-0.00	1.23	43.01	-0.08
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	11.37	-0.95	-0.55	-19.20	37.53	-0.14
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	11.37	-0.55	-0.95	-34.16	22.57	-0.17
Dead+Wind 0 deg - Service	4.51	0.00	-0.94	-34.34	0.20	0.00
Dead+Wind 30 deg - Service	4.51	0.47	-0.82	-29.72	-17.03	0.00
Dead+Wind 60 deg - Service	4.51	0.82	-0.47	-17.11	-29.64	-0.00
Dead+Wind 90 deg - Service	4.51	0.94	-0.00	0.12	-34.25	-0.00
Dead+Wind 120 deg - Service	4.51	0.82	0.47	17.35	-29.64	-0.00
Dead+Wind 150 deg - Service	4.51	0.47	0.82	29.96	-17.03	-0.00
Dead+Wind 180 deg - Service	4.51	0.00	0.94	34.57	0.20	-0.00
Dead+Wind 210 deg - Service	4.51	-0.47	0.82	29.96	17.43	-0.00
Dead+Wind 240 deg - Service	4.51	-0.82	0.47	17.35	30.04	-0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 270 deg - Service	4.51	-0.94	-0.00	0.12	34.66	0.00
Dead+Wind 300 deg - Service	4.51	-0.82	-0.47	-17.11	30.04	0.00
Dead+Wind 330 deg - Service	4.51	-0.47	-0.82	-29.72	17.43	0.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-4.51	0.00	0.00	4.51	0.00	0.000%
2	0.00	-5.41	-4.05	0.00	5.41	4.05	0.003%
3	0.00	-4.06	-4.05	0.00	4.06	4.05	0.002%
4	2.03	-5.41	-3.51	-2.03	5.41	3.51	0.003%
5	2.03	-4.06	-3.51	-2.03	4.06	3.51	0.002%
6	3.51	-5.41	-2.03	-3.51	5.41	2.03	0.003%
7	3.51	-4.06	-2.03	-3.51	4.06	2.03	0.002%
8	4.05	-5.41	0.00	-4.05	5.41	-0.00	0.003%
9	4.05	-4.06	0.00	-4.05	4.06	-0.00	0.002%
10	3.51	-5.41	2.03	-3.51	5.41	-2.03	0.001%
11	3.51	-4.06	2.03	-3.51	4.06	-2.03	0.002%
12	2.03	-5.41	3.51	-2.03	5.41	-3.51	0.003%
13	2.03	-4.06	3.51	-2.03	4.06	-3.51	0.002%
14	0.00	-5.41	4.05	0.00	5.41	-4.05	0.003%
15	0.00	-4.06	4.05	0.00	4.06	-4.05	0.002%
16	-2.03	-5.41	3.51	2.03	5.41	-3.51	0.001%
17	-2.03	-4.06	3.51	2.03	4.06	-3.51	0.002%
18	-3.51	-5.41	2.03	3.51	5.41	-2.03	0.003%
19	-3.51	-4.06	2.03	3.51	4.06	-2.03	0.002%
20	-4.05	-5.41	0.00	4.05	5.41	-0.00	0.003%
21	-4.05	-4.06	0.00	4.05	4.06	-0.00	0.002%
22	-3.51	-5.41	-2.03	3.51	5.41	2.03	0.003%
23	-3.51	-4.06	-2.03	3.51	4.06	2.03	0.002%
24	-2.03	-5.41	-3.51	2.03	5.41	3.51	0.001%
25	-2.03	-4.06	-3.51	2.03	4.06	3.51	0.002%
26	0.00	-11.37	0.00	-0.00	11.37	0.00	0.004%
27	0.00	-11.37	-1.09	-0.00	11.37	1.09	0.004%
28	0.55	-11.37	-0.95	-0.55	11.37	DF	0.004%
29	0.95	-11.37	-0.55	-0.95	11.37	0.55	0.004%
30	1.09	-11.37	0.00	-1.09	11.37	0.00	0.004%
31	0.95	-11.37	0.55	-0.95	11.37	-0.55	0.004%
32	0.55	-11.37	0.95	-0.55	11.37	-0.95	0.004%
33	0.00	-11.37	1.09	-0.00	11.37	-1.09	0.004%
34	-0.55	-11.37	0.95	0.55	11.37	-0.95	0.004%
35	-0.95	-11.37	0.55	0.95	11.37	-0.55	0.004%
36	-1.09	-11.37	0.00	1.09	11.37	0.00	0.004%
37	-0.95	-11.37	-0.55	0.95	11.37	0.55	0.004%
38	-0.55	-11.37	-0.95	0.55	11.37	0.95	0.004%
39	0.00	-4.51	-0.94	-0.00	4.51	0.94	0.003%
40	0.47	-4.51	-0.82	-0.47	4.51	0.82	0.002%
41	0.82	-4.51	-0.47	-0.82	4.51	0.47	0.002%
42	0.94	-4.51	0.00	-0.94	4.51	0.00	0.002%
43	0.82	-4.51	0.47	-0.82	4.51	-0.47	0.003%
44	0.47	-4.51	0.82	-0.47	4.51	-0.82	0.003%
45	0.00	-4.51	0.94	-0.00	4.51	-0.94	0.003%
46	-0.47	-4.51	0.82	0.47	4.51	-0.82	0.003%
47	-0.82	-4.51	0.47	0.82	4.51	-0.47	0.003%
48	-0.94	-4.51	0.00	0.94	4.51	0.00	0.003%
49	-0.82	-4.51	-0.47	0.82	4.51	0.47	0.003%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
50	-0.47	-4.51	-0.82	0.47	4.51	0.82	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	12	0.00000001	0.00008869
3	Yes	12	0.00000001	0.00007201
4	Yes	12	0.00000001	0.00012925
5	Yes	12	0.00000001	0.00010550
6	Yes	12	0.00000001	0.00013806
7	Yes	12	0.00000001	0.00011280
8	Yes	12	0.00000001	0.00008557
9	Yes	12	0.00000001	0.00006942
10	Yes	13	0.00000001	0.00005877
11	Yes	12	0.00000001	0.00012827
12	Yes	12	0.00000001	0.00012258
13	Yes	12	0.00000001	0.00009989
14	Yes	12	0.00000001	0.00008888
15	Yes	12	0.00000001	0.00007213
16	Yes	13	0.00000001	0.00005629
17	Yes	12	0.00000001	0.00012237
18	Yes	12	0.00000001	0.00014002
19	Yes	12	0.00000001	0.00011399
20	Yes	12	0.00000001	0.00008590
21	Yes	12	0.00000001	0.00006961
22	Yes	12	0.00000001	0.00012490
23	Yes	12	0.00000001	0.00010167
24	Yes	13	0.00000001	0.00006011
25	Yes	12	0.00000001	0.00013114
26	Yes	8	0.00000001	0.00005812
27	Yes	11	0.00000001	0.00006813
28	Yes	11	0.00000001	0.00006481
29	Yes	11	0.00000001	0.00006425
30	Yes	11	0.00000001	0.00006488
31	Yes	11	0.00000001	0.00006964
32	Yes	11	0.00000001	0.00007034
33	Yes	11	0.00000001	0.00007374
34	Yes	11	0.00000001	0.00007664
35	Yes	11	0.00000001	0.00007603
36	Yes	11	0.00000001	0.00007444
37	Yes	11	0.00000001	0.00007291
38	Yes	11	0.00000001	0.00007337
39	Yes	11	0.00000001	0.00006749
40	Yes	11	0.00000001	0.00006432
41	Yes	11	0.00000001	0.00006423
42	Yes	11	0.00000001	0.00006729
43	Yes	11	0.00000001	0.00006442
44	Yes	11	0.00000001	0.00006477
45	Yes	11	0.00000001	0.00006804
46	Yes	11	0.00000001	0.00006509
47	Yes	11	0.00000001	0.00006518
48	Yes	11	0.00000001	0.00006823
49	Yes	11	0.00000001	0.00006500
50	Yes	11	0.00000001	0.00006465

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	59 - 0	5.487	47	0.6110	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
54.00	Generic Style 1A - Twin PCS	47	5.022	0.5592	0.0000	Inf

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	59 - 0	23.554	18	2.6229	0.0100

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
54.00	Generic Style 1A - Twin PCS	18	21.558	2.4006	0.0091	Inf

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	59 - 0 (1)	P12x.5	59.00	0.00	0.0	19.2423	-5.40	606.13	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	59 - 0 (1)	P12x.5	149.01	197.07	0.756	0.00	197.07	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	59 - 0 (1)	P12x.5	4.07	303.07	0.013	0.00	297.74	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	59 - 0 (1)	0.009	0.756	0.000	0.013	0.000	0.765 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	59 - 0	Pole	P12x.5	1	-5.40	606.13	76.5	Pass
							Summary	
							Pole (L1) 76.5	Pass
							RATING = 76.5	**Pass**

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#:	
Site Name:	*CTFF626A*
App #:	
Pole Manufacturer:	*Other*

Reactions		
Mu:	149	ft-kips
Axial, Pu:	5	kips
Shear, Vu:	4	kips
Eta Factor, η	0.55	TIA G (Fig. 4-4)

Anchor Rod Data		
Qty:	8	
Diam:	1.375	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	20	in

If No stiffeners, Criteria: AISC LRFD <-Only Applcable to Unstiffened Cases

Anchor Rod Results

		Stiffened
Max Rod (Cu+ Vu/ή):	46.2 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	139.2 Kips	φ*Tn
Anchor Rod Stress Ratio:	33.2% **Pass**	

Plate Data		
Diam:	26	in
Thick:	2	in
Grade:	50	ksi
Single-Rod B-eff:	4.71	in

Base Plate Results Flexural Check

		Stiffened
Base Plate Stress:	7.9 ksi	AISC LRFD
Allowable Plate Stress:	45.0 ksi	φ*Fy
Base Plate Stress Ratio:	17.6% **Pass**	Y.L. Length: N/A, Roark

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.25	in
Width:	6.25	in
Height:	18.75	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	70	ksi

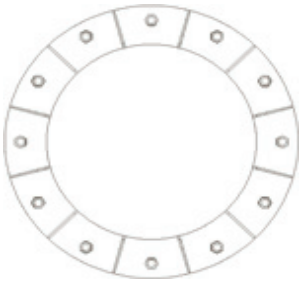
Stiffener Results

Horizontal Weld :	31.7% **Pass**
Vertical Weld:	21.8% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	4.5% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	21.0% **Pass**
Plate Comp. (AISC Bracket):	23.6% **Pass**

Pole Results

Pole Punching Shear Check:	6.0% **Pass**

Pole Data		
Diam:	12	in
Thick:	0.5	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Exhibit E

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CTFF626A

CT626/Hattertown Rd Silo
90 Hattertown Rd
Newtown, CT 06470

January 12, 2017

EBI Project Number: 6217000102

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	9.26 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

January 12, 2017

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CTFF626A – CT626/Hattertown Rd Silo**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **90 Hattertown Rd, Newtown, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (µW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **90 Hattertown Rd, Newtown, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

3) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

4) Since all radios are ground mounted there are additional cabling losses accounted for. For each ground mounted RF path the following losses were calculated. 0.52 dB of additional cable loss for all ground mounted 700 MHz Channels and 0.92 dB of additional cable loss for all ground mounted 1900 MHz channels. This is based on manufacturers Specifications for 75 feet of 1-1/4" coax cable on each path.

5) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

6) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antennas used in this modeling are the **RFS DBXNH-6565A-VTM** for 1900 MHz (PCS) and 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **RFS DBXNH-6565A-VTM** has a maximum gain of **15.5 dBd** at its main lobe at 1900 MHz and a maximum gain of **11.3 dBd** at its main lobe at 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antenna mounting height centerline of the proposed antennas is **54 feet** above ground level (AGL).

9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

10) All calculations were done with respect to uncontrolled / general public threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS DBXNH-6565A-VTM	Make / Model:	RFS DBXNH-6565A-VTM	Make / Model:	RFS DBXNH-6565A-VTM
Gain:	15.5 dBd / 11.3 dBd	Gain:	15.5 dBd / 11.3 dBd	Gain:	15.5 dBd / 11.3 dBd
Height (AGL):	54	Height (AGL):	54	Height (AGL):	54
Frequency Bands	1900 MHz (PCS) / 700 MHz	Frequency Bands	1900 MHz (PCS) / 700 MHz	Frequency Bands	1900 MHz (PCS) / 700 MHz
Channel Count	5	Channel Count	5	Channel Count	5
Total TX Power(W):	210	Total TX Power(W):	210	Total TX Power(W):	210
ERP (W):	5,526.43	ERP (W):	5,526.43	ERP (W):	5,526.43
Antenna A1 MPE%	9.26	Antenna B1 MPE%	9.26	Antenna C1 MPE%	9.26

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**9.26 %**
No Additional Carriers Per CSC Active Database0	NA
Site Total MPE %:	**9.26 %**

T-Mobile Sector A Total:	9.26 %
T-Mobile Sector B Total:	9.26 %
T-Mobile Sector C Total:	9.26 %
Site Total:	9.26 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile PCS - 1950 MHz LTE	2	1,722.47	54	53.75	PCS - 1950 MHz	1000	5.38%
T-Mobile PCS - 1950 MHz GSM	2	861.23	54	26.88	PCS - 1950 MHz	1000	2.69%
T-Mobile 700 MHz LTE	1	359.02	54	5.60	700 MHz	467	1.20%
						Total:	**9.26%**

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	9.26 %
Sector B:	9.26 %
Sector C:	9.26 %
T-Mobile Per Sector Maximum:	9.26 %
Site Total:	9.26 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **9.26%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.